Volunteer Lake Assessment Program Individual Lake Reports

KEZAR LAKE, SUTTON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	6,848	**Max. Depth (m):**	8.2	**Flushing Rate (yr^{-1}):**	8.2
Surface Area (Ac.):	182	**Mean Depth (m):**	2.7	**P Retention Coef:**	0.46
Shore Length (m):	3,400	**Volume (m^3):**	1,975,500	**Elevation (ft):**	906

TROPHIC CLASSIFICATION

Year	Trophic class
1984	MESOTROPHIC
2003	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

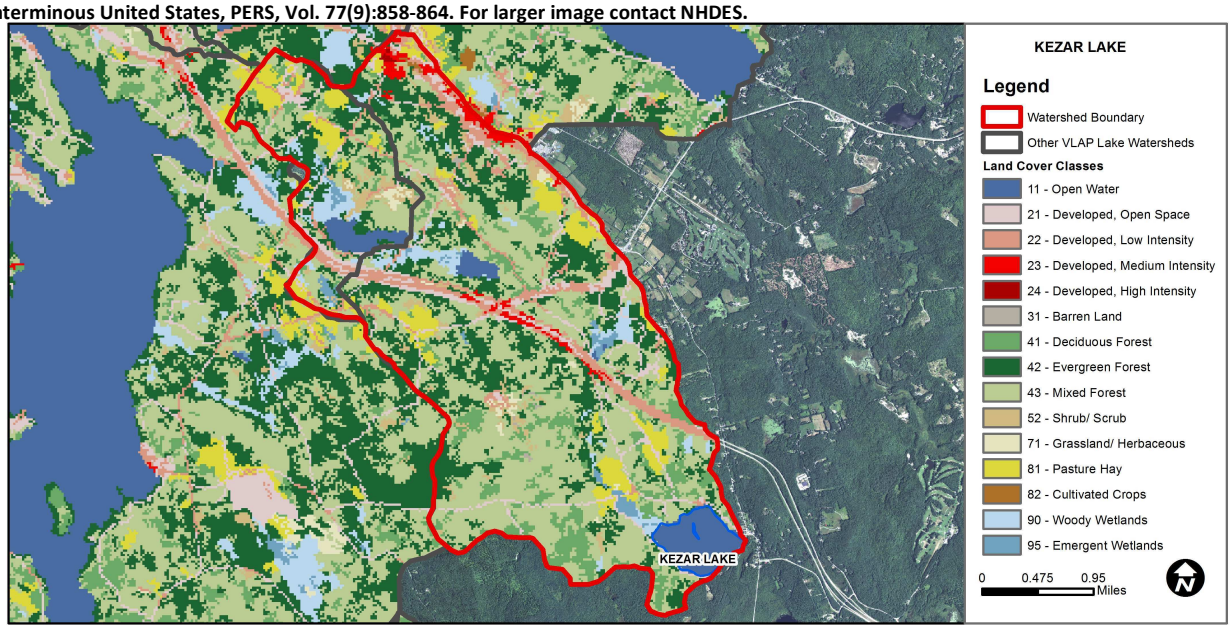
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Encouraging	>2 samples exist that are > 75% of geometric mean criteria, but not enough samples to calculate geomertic mean. No single sample exceedances. More data needed.
	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

KEZAR LAKE - WADLEIGH STATE PARK BEACH	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
KEZAR LAKE - WADLEIGH STATE PARK BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	4.46	Barren Land	0.14	Grassland/Herbaceous	0.73
Developed-Open Space	5.86	Deciduous Forest	8.25	Pasture Hay	6.39
Developed-Low Intensity	6.24	Evergreen Forest	22.37	Cultivated Crops	0.07
Developed-Medium Intensity	1.39	Mixed Forest	36.49	Woody Wetlands	3.22
Developed-High Intensity	0.07	Shrub-Scrub	3.27	Emergent Wetlands	1.11

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
KEZAR LAKE, NORTH SUTTON, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll was slightly elevated in July and returned to normal levels in September. 2013 average levels increased slightly from 2012 however were below the state median. Historical trend analysis indicates significantly decreasing (improving) chlorophyll since monitoring began. We hope to see this continue!
- **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity were elevated and much greater than the state median, particularly at Trussel Ridge. Historical trend analysis indicates relatively stable epilimnetic conductivity with moderate variability between years.
- **E. COLI:** E. coli levels were well below state standards for public beaches and surface waters.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels were elevated throughout the summer. June and July sampling events occurred within 24-72 hours after significant storm events of two to five inches of rainfall. Stormwater runoff likely contributed to the excess phosphorus. Historical trend analysis indicates epilimnetic phosphorus levels vary widely between years. Hypolimnetic phosphorus levels were average and less than epilimnetic levels. Tributary phosphorus levels were average throughout the summer.
- **TRANSPARENCY:** Transparency decreased from 2012 and was lowest in July when algal growth was greatest. Stormwater runoff also likely impacted lake transparency as significant storm events occurred prior to each sampling event. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **TURBIDITY:** Epilimnetic turbidity was elevated throughout the summer likely a result of stormwater runoff as well as the increased algal growth in July. Hypolimnetic turbidity was elevated in June and August and laboratory staff indicated sediment in the samples. Inlet turbidity was elevated in June after a significant storm event.
- **PH:** Deep spot pH fluctuates between good and critical levels. Tributary pH is generally good. pH levels at all stations were low in June and July following significant storm events.
- **RECOMMENDED ACTIONS:** The 2013 sampling events occurred following 4-5 inches of rainfall in June, 2-4 inches of rainfall in July, and less than 1 inch of rainfall in August. Stormwater runoff impacted epilimnetic total phosphorus and turbidity levels, lake transparency, and algal growth. Tributary water quality remained average indicating that lake front properties and roadways are likely the main contributors to the increased deep spot phosphorus and turbidity and corresponding increase in algal growth and decreased transparency. Historical epilimnetic phosphorus data indicate total phosphorus levels spike in years receiving a large number of significant storm events. It is predicted that we will continue to experience these large volume storm events and it is important to reduce stormwater runoff to the lake. Educate waterfront property owners on ways to reduce stormwater runoff from their properties utilizing DES' "Homeowner's Guide to Stormwater Management". Identify areas of stormwater erosion and implement and install best management practices to reduce future stormwater impacts.

Table 1. 2013 Average Wate Quality Data for KEZAR LAKE

Station Name	Alk.	Chlor-a	Cond.	E. Coli	Total P	Trans.		Turb.	pH
	mg/l	ug/l	uS/cm	#/100ml	ug/l	m		ntu	
						NVS	VS		
Boat Launch				31					
Epilimnion	8.03	4.13	129.0		21	2.23	3.03	1.56	6.57
Hypolimnion			136.7		15			8.59	6.54
Inlet			162.7	38	16			1.95	6.53
Lyon Brook At Trussel Ridge			270.5		17			1.36	6.71
Outlet			132.4	22	11			0.94	6.71

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Degrading	Data significantly decreasing.	Chlorophyll-a	Improving	Data significantly decreasing.
Conductivity	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.